

VERSATILE CELL FACTORIES FOR SUSTAINABLE BIOPROCESSES

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ABSTRACT

The utilization of an increasingly diverse range of cheap waste substrates will be an ongoing challenge for the bio-based economy, where the mobilization of nutrients from a variety of waste products will be necessary for realization of biosustainability on an industrial scale. Bioprocesses utilizing traditionally applied cell factories (such as *Saccharomyces cerevisiae*) are generally based on a limited range of substrates (mainly glucose). However, a wider diversity in substrate range is highly desirable in developing biorefinery scenarios where feed-stocks containing combinations of carbon sources are typically employed. In addition to plant biomass hydrolysates, glycerol is of interest here, being available in amounts relevant for industrial scale bioprocesses due to increased production of biodiesel.

Yarrowia lipolytica is a versatile yeast in terms of its substrate utilization range and broad product spectrum which includes lipids, organic acids and polyols. The metabolism displayed by *Y. lipolytica* is dependent on growth and medium conditions and bioprocesses can be designed dependent on the available substrate and desired product. *Y. lipolytica* has several advantages compared to typically applied cell factories, such as favourable growth rates on alternative carbon sources (e.g. pentose sugars, glycerol) and a lack of carbon catabolite repression which can hamper the parallel consumption of different carbon sources in mixed substrates resulting in lengthened bioprocess times. This presentation will demonstrate the value of this yeast for the bioconversion of sustainable substrates using mannitol production as an example.